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DESCRIPTION OF THE BRAIN OF JOHN M. WILSON, RECENTLY HANGED AT NORRISTOWN.

Read before the Philadelphia Neurological Society

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THE brain came into the possession of the writer accompanied by a portion of the dura mater and the other enveloping membranes. Drs. R. H. Chase and Henry Sykes made a verbal report to me in reference to the skull. In the first place, the head was unusually large, while the face was disproportionately small. On opening the cranium, over six ounces of cerebro-spinal fluid escaped. The bones were very thin, and the sutures all completely fused. The dura was thickened and decidedly adherent to the inner surface of the calvarium, thus giving evidence of external ossific pachymeningitis. The pia was thickened, loose, and excessively oedematous. Its meshes were everywhere filled with fluid. In addition, it was injected and presented numerous milky opacities, such as are not infrequently found in alcoholic subjects. On the mesial surfaces of the hemispheres the two opposed layers of the pia, where not separated by the falx, were everywhere coherent, thus showing positive inflammatory change.

The two hemispheres were unequal in size, the left being much the larger. The lateral ventricles were somewhat dilated, and their walls excessively pale, as were also the walls of the third ventricle. The

white substance of the brain, too, was likewise unusually pale, though here and there some of the smaller vessels appeared injected, probably due to the mode of death. The velum interpositum was infiltrated. The pineal gland was large and oedematous.

The brain throughout was exceedingly soft. The crura, pons, cerebellum, and medulla partook in general of the character of the hemispheres.

The brain—all fluid having been allowed to drain away—was weighed, the weight equalling fifty-seven and a half ounces. Its great size was very striking.

The most interesting feature, however, in connection with this examination was the study of the convolutions. Taking up, to begin with, the left hemisphere and studying its lateral surface, we notice at once an unusual degree of confluence between various fissures, and also the presence of a large number of abnormal fissures. For instance, the fissure of Rolando is superficially confluent with the Sylvian, being separated from the latter by the merest strip of tissue. The precentral fissure is freely confluent with the Sylvian. The interparietal is confluent with a small transverse fissure cutting

deeply into the *pli de passage supérieure externe*, and evidently a detached portion of the parieto-occipital fissure. This is an ape-like characteristic. Other evidences of confluence can be seen in the parallel fissure, which is confluent with a number of perpendicular fissures.

Some of the abnormal fissures of the lateral surface are of morphological significance; others must be regarded as purely pathological. Studied from before backward, they are as follows. First an abnormal perpendicular fissure close to the apex of the frontal lobe. It starts from the anterior portion of the third frontal convolution, which it incises; then passes in a more or less perpendicular direction upward, prevents the normal development of the second frontal fissure, cuts deeply through the second frontal convolution, and finally fuses with the first frontal fissure. Secondly, the fissure occupying the position of the normal precentral fissure presents a very unusual appearance. A fissure confluent with the Sylvian passes upward and joins as normally the second frontal fissure. At this point, however, it becomes more like a cleft than a fissure, and deeply incises the second frontal convolution, becoming all but confluent with the superior frontal fissure,—is in reality superficially continuous with it. Again, at the point of junction with the second frontal fissure, two abnormal fissures arise, one passing obliquely downward into the operculum, the other obliquely upward and backward into the posterior portion of the second frontal convolution. An irregularly stellate arrangement is thus produced.

As occasionally found in other brains, the superior frontal fissure is confluent with a perpendicular fissure, really a precentral fissure, just in front of the fissure of Rolando. It is large and deep. We thus have in this frontal lobe three well-marked perpendicular or precentral fissures. The significance of this fact will be presently discussed.

The parietal, temporal, and occipital lobes also present a number of remarkable fissures, all of them having a more or less perpendicular direction. For instance, directly opposite the parieto-occipital fissure is found an external perpendicular fissure, homologous doubtless with the corresponding fissure in the apes. It runs obliquely downward, and in the lower

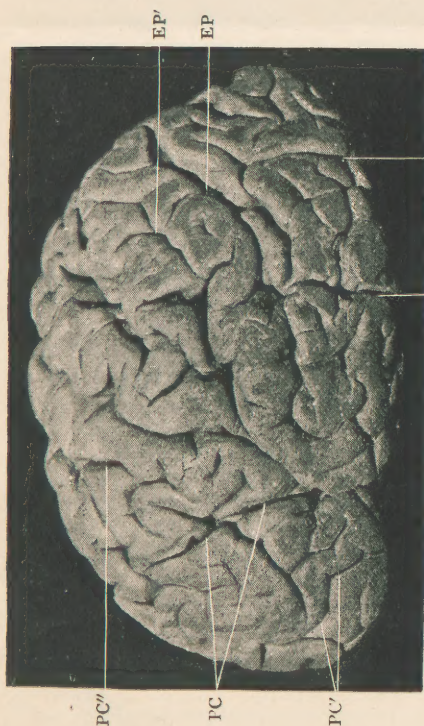
portion of its course it is confluent with the parallel. In advance of and pursuing a similar direction to this fissure, and separated from it by what is apparently the angular gyrus, is another perpendicular fissure. It separates the angular gyrus from the supra-marginal lobule, is shallow and blind at both ends, though at first sight it appears as though confluent with the Sylvian. It is doubtless a "vegetative repetition"* of the first-mentioned perpendicular fissure.

A deep and well-marked Wernicke's fissure is present. It pursues an almost perpendicular course downward, immediately beneath the first-mentioned external perpendicular fissure. Strange to say, in advance of it—parallel to it, though separated from it by a large block of tissue—is found another vertical fissure, corresponding doubtless to the above second-described external perpendicular fissure, and, like it, a "vegetative repetition." This fissure deeply bisects the temporal lobe, and is confluent with the parallel.

On the occipital lobe the interparietal terminates, as normally, in a transverse occipital fissure, and below this a parallel "vegetative repetition" (a second occipital fissure?) is found.

The mesial surface of this hemisphere, upon being examined, proves no less interesting. The callosomarginal fissure is more complex than usual by a tendency to confluence with fissures pursuing transverse or perpendicular directions. The quadrate lobule is large, and contains an unusually deep, irregularly H-shaped fissure. The most remarkable feature of the mesial surface, however, is that the parieto-occipital fissure is bifurcated. This bifurcation is produced by the development of a highly aberrant convolution, the *pli de passage supérieure interne* of Gratiolet. This remarkable convolution the writer had never seen developed to the surface in any human brain, with the single exception of that of an epileptic; in which, however, it was comparatively small. This internal superior *pli de passage* is normally developed in the anthropoid apes, notably the chimpanzee. In the present instance it has the shape of a large equilateral triangle, encroaching markedly upon the cuneus. The latter is relatively small. The

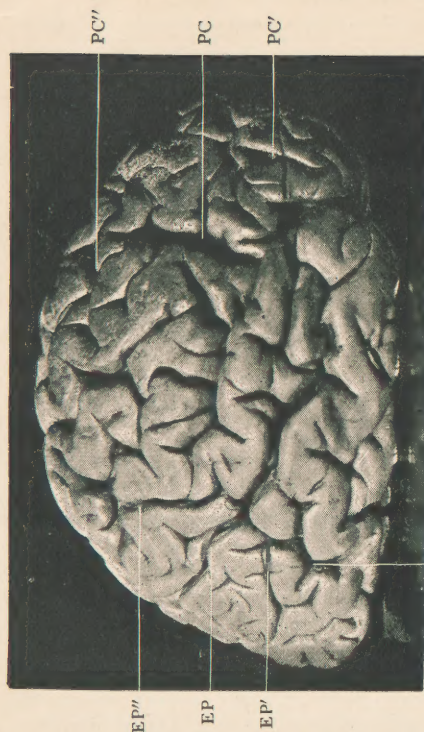
* See Proceedings of the Academy of Natural Sciences, Philadelphia, 1878. Communication by Dr. A. J. Parker.



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W

LEFT HEMISPHERE.—LATERAL SURFACE.

PC = precentral fissure. PC' and PC'' = unusual precentral fissures. EP = external perpendicular fissure. EP' = vegetative repetition of EP. W = Wernicke's fissure. W' = vegetative repetition of W. EP and W, taken together, form an irregular arc. EP' and W' also suggest an incomplete second arc.



W

RIGHT HEMISPHERE.—LATERAL SURFACE.

EP = external perpendicular fissure. EP' and EP'' = vegetative repetitions of EP. W = Wernicke's fissure. As in the left hemisphere, EP and W constitute an arc. PC = precentral fissure. PC' and PC'' = unusual precentrals (vegetative repetitions). In advance of W is a short perpendicular fissure which suggests a second Wernicke.



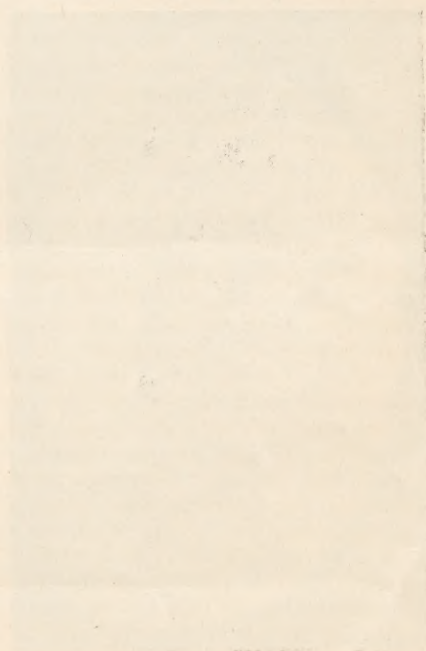
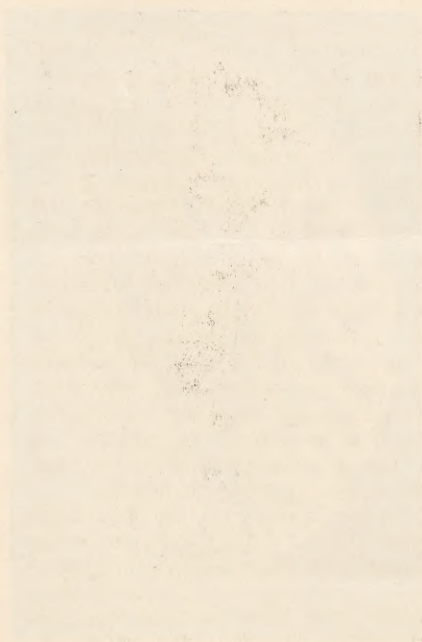
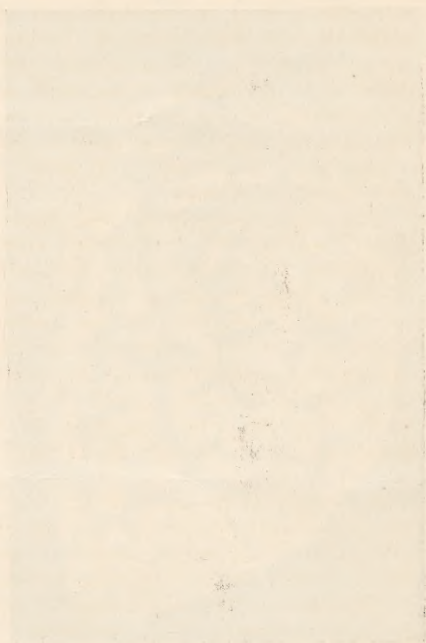
LEFT HEMISPHERE.—MESIAL SURFACE.

SIP = superior internal *pli de passage*.



RIGHT HEMISPHERE.—MESIAL SURFACE.

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calcarine is long and sinuous, and terminates without bifurcating on the apex of the occipital lobe. It is superficially confluent with the fissura hippocampi, as the gyrus fornicatus is at this point submerged. Beneath the calcarine is found a shallow "vegetative repetition." A deep collateral fissure is present.

The right hemisphere resembles in a general way the left. It differs, however, as follows. In the first place, the tendency to transverse fissuration, so well marked in the left hemisphere by the presence of three (precentral) perpendicular fissures, is much less pronounced on this side. A faint depression alone marks an analogy to the first precentral fissure of the other hemisphere; the second (the normal) precentral is not confluent with the Sylvian, and, though deep, is not by any means as complex as its fellow on the opposite brain; while a third precentral, though present, is much smaller than its opposite fellow.

The fissure of Rolando is superficially and irregularly confluent with the Sylvian. The fissure of Sylvius, though short, presents nothing worthy of note beyond a superficial confluence with the anterior portion of the interparietal. The latter, with the exception just mentioned, giving off a small retro-central branch, pursues an average course, winding around an unusually large *pli de passage supérieure externe*, and finally terminates in a small transverse occipital. The parallel fissure is remarkable for being confluent with no less than three external perpendicular fissures. The middle and principal one of these arises opposite the parieto-occipital fissure, and, passing downward and forward, becomes confluent, as just stated, with the parallel. The one anterior separates, as upon the opposite hemisphere, the angular and supra-marginal convolutions. It is also deeper than its opposite fellow. It runs directly downward, and is confluent with both the interparietal and parallel fissures. The third and posterior runs downward and forward, approaching more nearly a horizontal direction. It is deep, but terminates superficially in a well-marked Wernicke's fissure. This last-mentioned fissure is remarkable for being *directly continuous* with the middle or principal external perpendicular fissure. By this means the occipital lobe is sharply demarcated from the parietal and temporal lobes, thus reproducing the condition found in the apes.

Upon the mesial surface the same tendency is observed, as in the opposite hemisphere, of confluence of the colosso-marginal fissure with transverse or perpendicular fissures, though it is here less marked. The quadrate lobule again is very large, and marked by unusually deep stellate fissures. As upon the opposite side, the parieto-occipital fissure is bifurcated. A superior internal *pli de passage* is present, though it is very much smaller than upon the opposite side. Strangely enough, the superior external *pli de passage* is relatively very large on this side, whilst upon the opposite hemisphere, in which the *internal* convolution is so large, the *external* convolution is relatively small. The cuneus is a trifle larger than upon the opposite side. The calcarine is smaller, and less sinuous, but terminates without bifurcating, as in the opposite brain. The calcarine, however, *passes directly into the fissura hippocampi*, the gyrus fornicatus being here entirely absent. This is another striking ape-like characteristic.

In taking a general glance at this remarkable brain, it is evident, as pointed out by the writer in a recent paper on "Epileptic Brains," that two powerful factors have combined to produce this distorted and aberrant organ. In the first place, there was in this brain a distinct morphological factor: that is, the line of development, instead of following the direction usual in the human brain, was deflected early in its course, so as to reproduce more or less perfectly structures and conditions found in the apes. The term "arrest of development" will hardly cover the production of ape-like structures such as instanced in the superior internal *pli de passage*. It seems, indeed, as though arrest of structure in one part necessitated the hyperdevelopment of some other part. Now, forcible arrest of growth readily presents itself as an interfering or deflecting cause. Let us reflect a little further, and the difficulties may solve themselves.

What is the meaning of this thin, large, and dilated skull? What is the meaning of this transverse fissuration of the brain? Evidently the two go hand in hand. Evidently this large, excessive brain-mass developed under pressure, and transverse clefts, most marked at the two poles of the brain, were the natural result. But is this all? Why does this transverse fissuration

simulate so closely the fissuration found in the apes? Evidently those areas of the cerebral cortex in man which most distinguish him from the ape are of *late*—of *recent*—development. They represent, therefore, areas in which the developmental force, or growth-force, is relatively weak. Given, then, an interfering or repressive cause, these areas are the first to yield to the stress of circumstances. They remain undeveloped. *Their very absence, however, necessitates the reproduction of other portions, portions long disused, and therefore rudimentary or absent in the normal state.* In this way the writer would explain the production of such a wonderful structure as that represented in the *pli de passage supérieure interne* of this brain.

If this view be correct, the pathological factor is, after all, dominant, and in the present instance the condition of the skull and the evidences of inflammatory changes in the membranes certainly help to bear it out, as does also the microscopic examination. Sections were prepared by Dr. Ida V. Reel. They were taken from the para-

central lobules of either hemisphere. They show, in certain portions of the white matter, decided increase of the neuroglia, dilatation of the periganglionic lymph-spaces, with consequent or concomitant shrinking of the cells, an increase in the number and tortuosity of the vessels, here and there a capillary with its walls infiltrated with nuclei, and sometimes a dilated perivascular space. In one and the same section, however, are found cells which present nothing abnormal whatever. Doubtless enough of such tissue was present to maintain cerebation.

The writer refrains from making comments on the mental condition of the possessor of such a brain. He does not, however, believe that any one with a full knowledge of the facts would predicate of such a brain a normal mind, and yet such an individual might be perfectly able to appreciate the consequences of crime, to differentiate between right and wrong, and to be, in the eyes of the law, a responsible individual. With this, however, the pathologist has nothing to do.